



# A Bibliometric Analysis of E-Purchasing Implementation in Public Sector Procurement of Goods and Services in Indonesia, 2019–2024

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## ABSTRACT

**Background:** The implementation of e-purchasing in the procurement of goods and services has become an important part of public sector governance reform in Indonesia. Along with the acceleration of digital transformation, research on e-purchasing has grown significantly and reflects increasing attention to transparency, efficiency, and accountability in public procurement.

**Purpose:** This study aims to analyze the development of research on the implementation of e-purchasing in public sector procurement in Indonesia during the 2019–2024 period and to identify major publication trends, thematic clusters, and challenges discussed in the literature.

**Methods:** This study applies a bibliometric approach using data obtained from the Google Scholar database. Data were collected and filtered using Publish or Perish (PoP), while mapping and visualization analyses were conducted using VOSviewer. The analysis focuses on publication growth, keyword co-occurrence, research clustering, and the evolution of terms used in the literature.

**Results:** The findings show a significant annual increase in publications related to e-purchasing, with a total of 537 articles identified during the study period. The bibliometric mapping reveals four major research clusters that represent the main themes in the literature. The study also identifies several barriers to e-purchasing implementation, including limited human resources and resistance to changes in work culture. In addition, the analysis indicates a shift in the terminology used across publications over time.

**Conclusions:** Research on e-purchasing in Indonesia's public sector procurement has developed rapidly over the last six years. The growing number of publications and thematic variations indicate that e-purchasing has become an increasingly relevant topic in efforts to improve procurement governance. However, implementation challenges remain, particularly in terms of human resource capacity and organizational adaptation.

**Research Contribution:** This study contributes to the literature by providing a comprehensive bibliometric overview of e-purchasing research in Indonesia's public sector procurement. It offers insights into research trends, thematic developments, and implementation barriers that may support future studies and inform policy improvement.

**Keywords:** procurement, e-purchasing, public sector, bibliometric analysis, Indonesia.

## INTRODUCTION

Rapid technological developments have created standards for the implementation of Good Governance in Indonesia. Good governance is a collective concept

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involving various actions or behaviors aimed at controlling, directing, or intervening in matters concerning society, reflecting good values in daily activities (Nurhidayat, 2023). Good governance is seen as a step towards achieving optimal and targeted government performance, particularly in meeting the legal needs of the community.

One step that can be taken to realize or actualize Good Governance is the implementation of e-Government, utilizing digital technology to improve the efficiency of public services and accountability for government performance (Batool et al., 2021). The implementation of e-Government is considered to have a strategic role in supporting government activities, particularly in the procurement of goods and services (Hochstetter et al., 2023). This is based on the belief that the use of digital technology can increase transparency, efficiency, and accountability at every stage of the procurement process, from determining needs to delivering the final results.

Procurement of Goods and Services is an activity of procuring goods and services by Ministries/Institutions/Regional Agencies funded by the State Budget/Regional Budget, the process of which begins with the identification of needs until the handover of work results, the definition of which has been stipulated in Presidential Regulation of the Republic of Indonesia Number 12 of 2021 (Rannie et al., 2024). In the context of procurement of goods and services, e-purchasing is one of the important mechanisms regulated in Presidential Regulation Number 12 of 2021, which allows purchases to be made transparently and efficiently through e-catalogs or online stores. According to Presidential Regulation Number 12 of 2021 concerning Amendments to Presidential Regulation Number 16 of 2018 concerning Procurement of Goods/Services, E-purchasing is a procedure for purchasing government goods/services through an electronic catalog system or online store.

However, the implementation of e-procurement still presents several challenges. This is due to limited human resources, with some procurement staff lacking training in procurement administration and information technology (Rannie et al., 2024). This limitation results in a lack of understanding of how to use digital systems to improve efficiency. Furthermore, implementing e-purchasing requires a change in work culture within government agencies, but this often faces resistance from employees already accustomed to conventional procurement methods. Furthermore, gaps in website infrastructure continue to exist, resulting in limited implementation of e-procurement in certain regions (Lenggogeni Amelia Puti Chaidir & Elisa Susanti, 2024).

This study used bibliometric analysis to identify developments in the application of e-purchasing in the procurement of goods and services (Passas, 2024). Through an analysis of relevant literature, this study examines two main issues: (1) the growth of scientific publications related to the topic of e-purchasing in the procurement of goods and services during the 2019-2024 period; and (2) how the distribution of scientific publications on the topic of e-purchasing in the procurement of goods and services during the period 2019-2024 is mapped. Therefore, this study aims to determine the development and growth of scientific publications and to map the trends in studies on e-purchasing in the procurement of goods and services. The novelty of this research lies in its bibliometric mapping efforts specifically for the topic of e-purchasing in the procurement of goods and services during the period 2019-2024. This allows it to provide a comprehensive overview of publication trends, the distribution of study themes, and the direction of research developments that have not been systematically examined in previous studies.

The method used in this study is descriptive bibliometric analysis. According to Hakim (2020), bibliometrics is a form of quantitative or qualitative measurement of the development of a field in research, literature, books, or documents using statistical methods. Bibliometrics is generally divided into two categories: descriptive bibliometrics and behavioral bibliometrics. Descriptive bibliometrics describes the nature of a literature, while behavioral bibliometrics studies the bonds that develop between components of the literature.

The data used in this study comes from publication data on e-purchasing in the procurement of goods and services from 2019 to 2024, with a limit of 1,000 documents, using the keywords procurement of goods and services, e-purchasing, public sector, as seen in Figure 1. The data collection technique was carried out by investigating publications indexed in Google Scholar using the Publish or Perish (PoP) application. The data was then obtained and stored in RIS (Research Information System Citation File) format. The data stored in RIS format was then subjected to bibliometric analysis using VOSViewer software. VOSViewer is able to provide visualization of the relationship between citations and subjects, group articles, create publication maps and is also able to create visualizations of trends in various articles (Lestary et al., 2023).

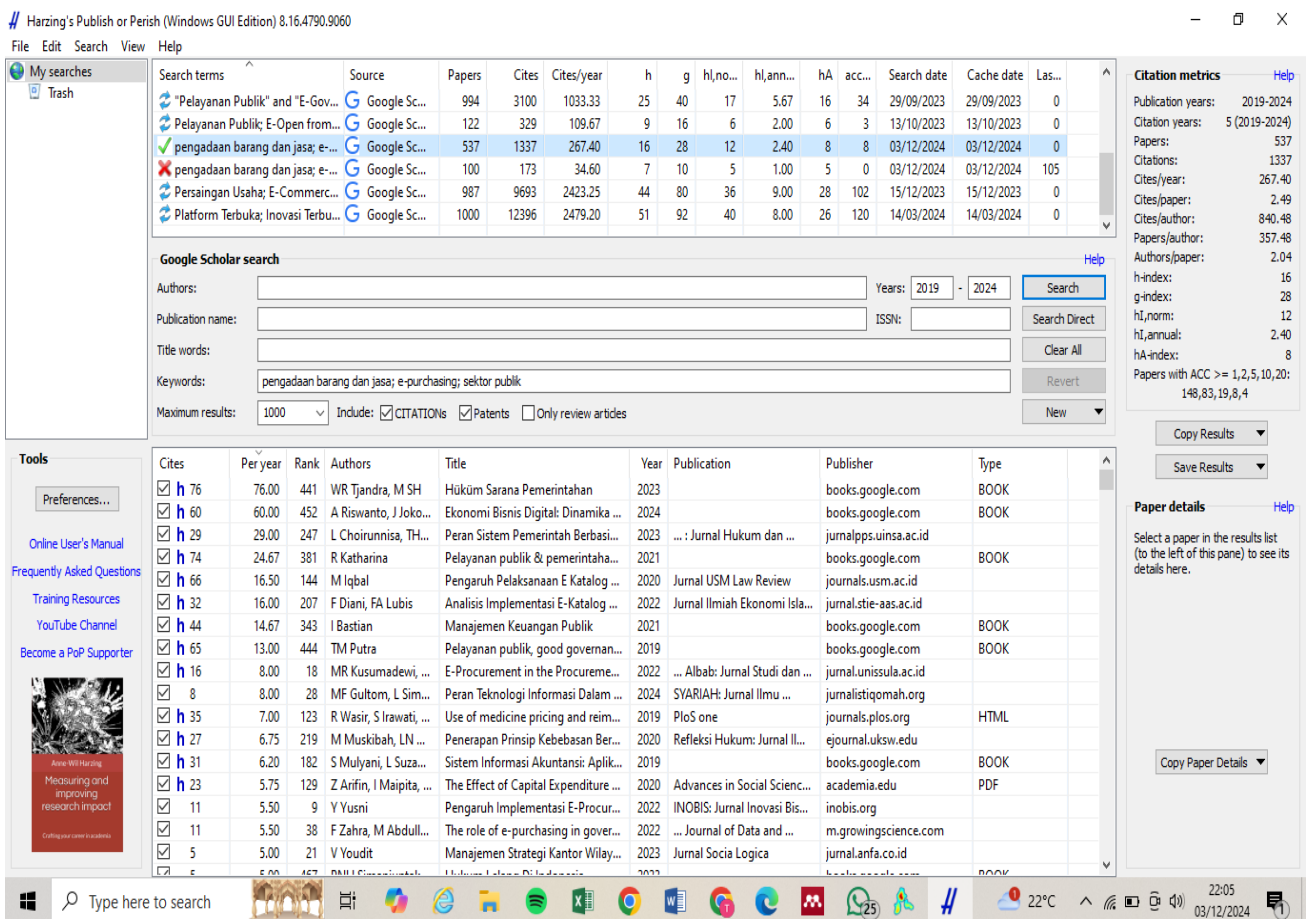


Figure 1. Google Scholar Database Search with Publish or Perish

Based on the database obtained through Google Scholar using Publish or Perish software from 2019 - 2024 in Table 1, the publication of articles on e-purchasing in the procurement of goods and services in the public sector contained 537 articles,

1337 citations, 267.40 citations per year, 2.49 citations per article, 357.48 authors per article, with 16 H indexes and 28 G indexes, 12 for individual H indexes and 8 for annual indexes, and 8 for the total hA index.

## RESULTS AND DISCUSSION

### Result

The development of scientific publications on e-purchasing in the procurement of goods and services in the public sector, published in journal articles indexed by Google Scholar, shows an annual increase from 2019 to 2024. Based on available data, the number of scientific publications on e-purchasing in the procurement of goods and services in the public sector is 537 journal articles.

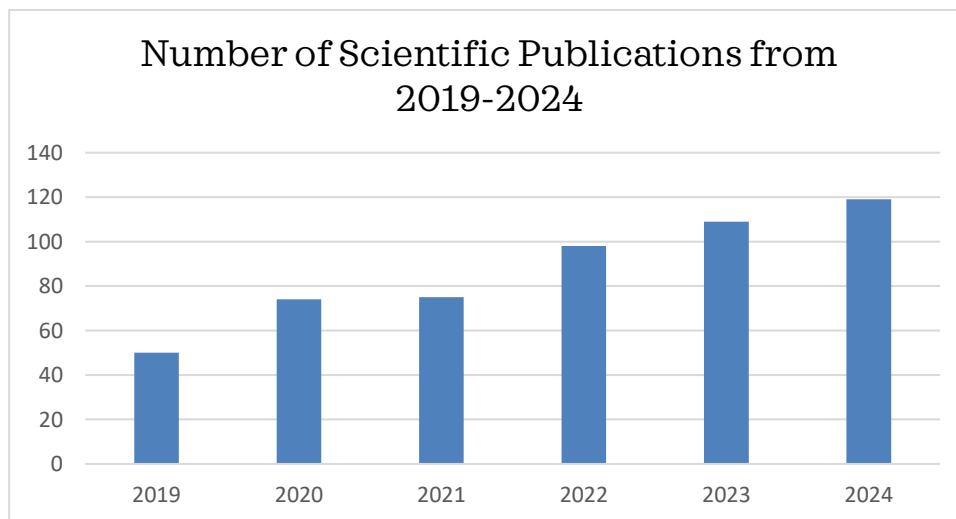
**Table 1. Development of Scientific Publications**

Year	Number of Publications
2019	50
2020	74
2021	75
2022	98
2023	109
2024	119

Source: Data processed by researchers (2024)

Based on Table 1, there were 50 publications in 2019, 74 publications in 2020, 75 publications in 2021, 98 publications in 2022, 109 publications in 2023, and 119 publications in 2024. However, there were 12 research publications with an unknown year of publication. Thus, there were 525 articles used in this study.

**Figure 2. Development of Scientific Publications 2019 - 2024**



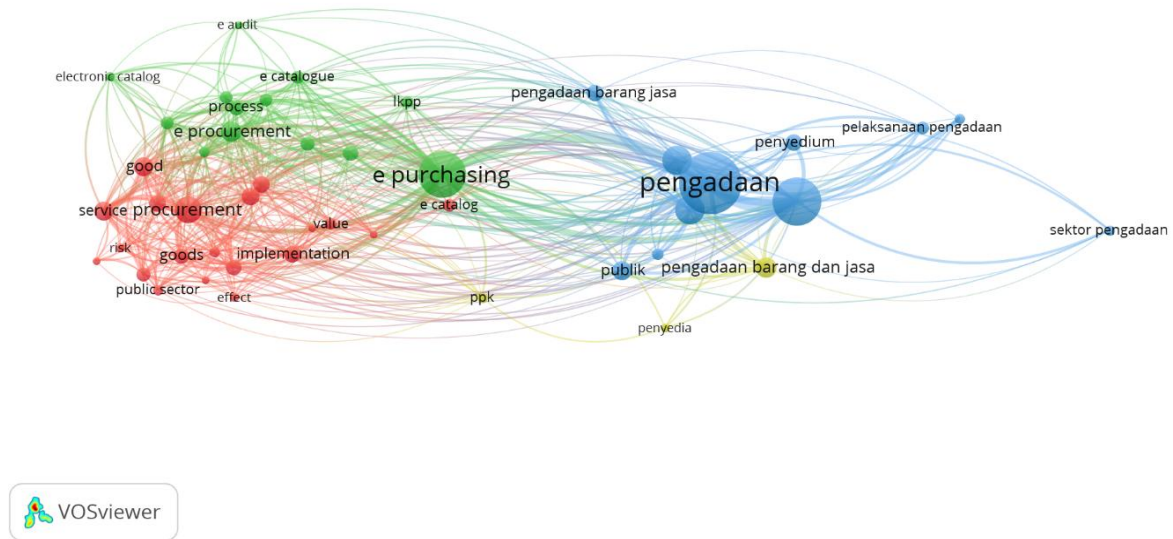
Source: Data processed by researchers (2024)

Figure 2 shows an increasing trend in the graph from 2019 to 2024. The figure shows an increase each year. Therefore, the lowest number of publications was in 2019, with 50 publications, and the highest number of publications was in 2024, with 119 publications.

The obtained research publications will then be mapped using software called

VOSViewer. The distance between connected dots in the network reflects the relationships between the variables being studied, while the size of the dots indicates the number of variables being analyzed simultaneously. The larger the dots, the more variables are involved in the research.

**Figure 3. Network Visualization VOSViewer**

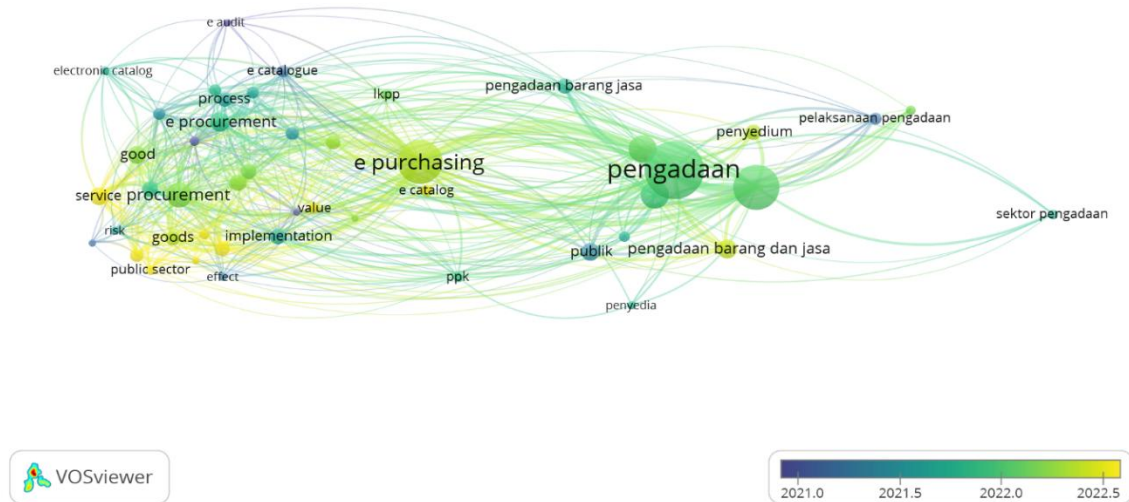


Source: VOSViewer

Figure 3 shows a network visualization of concurrent keyword usage. These keywords include "Procurement of Goods and Services," "E-Purchasing," and "Public Sector." The keyword "Procurement" has a larger circle, indicating that it is a frequently used keyword in research on e-purchasing in the procurement of goods and services.

The figure shows four clusters within it. The first cluster, colored red, consists of topics such as procurement, transparency, analysis, good, value, goods, implementation, risk, effect, e-catalog, system, government, service, corruption, public sector, public good, sector, direct procurement, services, and government procurement. The second cluster, colored green, includes e-purchasing, e-audit, LKPP, electronic catalog, e-catalog, process, use, e-procurement, goods service, e-tendering, problem, procedure, and e-purchasing. The blue color for the third cluster includes procurement, distributors, procurement of goods and services, procurement sectors, procurement implementation, procurement activities, public, services, government services, direct procurement, and the public sector. The yellow color for the fourth cluster includes providers, PPK, and procurement of goods and services.

**Figure 4. Overlay Visualization VOSViewer**



Source: VOSViewer

Figure 4. This is a VOSViewer visualization overlay image that appears along with the publication year. The image features three different colors: blue indicates if the keyword was shared in 2021, and green through yellow indicate if the keyword was shared in 2022. This indicates if there has been a change in terms over a specific time period.

### Discussion

The research results show that scientific publications on e-purchasing in the procurement of goods and services in the public sector experienced a consistent upward trend during the 2019-2024 period. The analyzed data shows that the number of publications increased from 50 articles in 2019 to 119 articles in 2024. Overall, these findings confirm that e-purchasing is receiving increasing attention from both academics and practitioners. This increase not only reflects a growing number of publications but also indicates that e-procurement has become an increasingly important topic in the discourse on bureaucratic reform, digital transformation, and governance. In the Indonesian context, transforming the procurement system from a manual to a digital model is positioned as a strategic step to increase government effectiveness, transparency, and accountability (Ayobami et al., 2024; Firmansyah et al., 2024a)

This upward trend in publications can also be understood as a response to the public sector's growing need for a procurement system that is faster, more documented, more traceable, and more resilient to irregularities. The LKPP (National Public Procurement Agency) regulations emphasize that the implementation of online stores and electronic catalogs in government procurement of goods/services is aimed at ensuring a fast, easy, transparent, and electronically recorded procurement process (Peraturan Lembaga Kebijakan Pengadaan Barang/Jasa Pemerintah Nomor 9 Tahun 2021 Tentang Toko Daring Dan

Katalog Elektronik Dalam Pengadaan Barang/Jasa Pemerintah, 2021). Therefore, the growing literature you find actually reflects developments in policy and practice on the ground. The literature evolves alongside the development of the regulatory and institutional infrastructure for digital procurement itself. This means that academic attention to e-purchasing is not merely a methodological trend, but rather part of a scientific response to the real institutional transformation of public procurement.

Furthermore, the increase in the number of publications from 50 articles in 2019 to 119 articles in 2024 represents an increase of approximately 138% over six years. This increase indicates that e-purchasing is no longer viewed as a narrow administrative issue but has shifted to become a multidimensional topic related to budget efficiency, government integrity, digital governance, provider competitiveness, and the quality of public services. The OECD explains that the digital transformation in public procurement is currently moving towards more connected, efficient, and user-oriented processes, with an emphasis on end-to-end process integration, the adoption of new technologies, and the use of data for decision-making (Melnyk et al., 2021). Therefore, the findings regarding the increase in publications in this research align with global developments that have placed digital procurement at the forefront of public sector reform.

In terms of substance, the increasing number of articles can also be interpreted as a sign that researchers are increasingly viewing e-purchasing as a strategic instrument for improving procurement governance. Findings by Jiménez et al. (Jiménez et al., 2022) indicate that the adoption of e-procurement systems is correlated with a decrease in corruption by companies in obtaining public contracts. The study emphasizes that e-procurement can reduce information uncertainty, suppress face-to-face interactions prone to informal transactions, and strengthen accountability. In other words, the growing number of studies on e-purchasing, as reflected in your data, is likely driven by the belief that procurement digitalization is not only a technical innovation but also an anti-corruption and governance improvement instrument. This perspective is relevant to the Indonesian context, which has been pushing procurement digitalization from the outset to reduce manual practices that are prone to irregularities (Firmansyah et al., 2024b; Salam et al., 2018).

However, a high publication growth rate does not automatically indicate that e-purchasing implementation has fully matured. In bibliometrics, an increasing number of publications often indicates that a field is developing rapidly, but still faces numerous conceptual, technical, and implementation challenges. This is evident in the results of this research's keyword mapping, which shows the emergence of various terms such as procurement, e-purchasing, e-catalog, e-procurement, government procurement, transparency, risk, corruption, and public sector. This diversity indicates that the field of e-purchasing research is cross-thematic and not yet fully homogeneous. In other words, the research focus is not only on electronic purchasing mechanisms but also on their links to integrity, risk, procedures, institutions, and public governance. Within a bibliometric framework, this pattern indicates that the field is moving from an exploratory stage to a consolidation of key themes. The use of VOSviewer in this research is appropriate because the tool is designed to map relationships between keywords and display bibliometric networks in an easily readable manner, particularly through co-occurrence analysis and cluster visualization (Hassan & Duarte, 2024).

The existence of four clusters in the network visualization provides important insights into the intellectual structure of e-purchasing studies. The first cluster, containing terms such as procurement, transparency, implementation, risk,

corruption, government, and service, can be interpreted as a group of studies that place e-purchasing within the perspective of governance and integrity. This cluster demonstrates that e-purchasing is not discussed solely as a transactional tool, but as part of an institutional reform strategy to improve government procurement processes. This interpretation aligns with the literature that states that the digitalization of public procurement is closely linked to increased transparency, oversight, and effectiveness of the procurement process (Ayobami et al., 2024).

The second cluster, containing terms such as e-purchasing, e-audit, LKPP, electronic catalog, e-catalogue, e-procurement, e-tendering, procedure, and process, indicates that most studies focus on the dimensions of digital procurement systems, procedures, and instruments. This means that research addresses not only policy outcomes but also institutional design and the operationalization of digital platforms. In the Indonesian context, this makes perfect sense, as e-purchasing operates within a fairly specific national policy framework, primarily through electronic catalogs, online stores, and the Public Procurement Service Provider (SPSE) regulated by the National Public Procurement Agency (LKPP) (2021). Thus, this cluster confirms that the development of knowledge on e-purchasing in Indonesia is heavily influenced by the evolution of national regulations and procurement systems.

The third and fourth clusters, dominated by Indonesian-language terms such as procurement, procurement of goods and services, public sector, provider, and PPK, demonstrate that research on e-purchasing remains strongly rooted in the domestic administrative context. This finding is significant because it demonstrates the localization of scientific discourse. This means that the development of the literature is not only adopting global terms like e-procurement or electronic catalog but also translating them into the Indonesian institutional context. This trend suggests two things. First, e-purchasing research in Indonesia is quite responsive to the practical needs of the national bureaucracy. Second, there is still an opportunity to increase the internationalization of research so that Indonesian terms, theoretical frameworks, and empirical findings can more easily connect with global academic discussions.

Furthermore, the overlay visualization results showing changes in terminology from approximately 2021 to 2022 indicate that this field of study is dynamic. Shifts in bibliometric terminology generally signal a change in focus, a deepening of the topic, or adjustments to policy and technological developments. In the case of this research, the shift from more general terms to more technical and systemic terms can be understood as a sign that e-purchasing studies are beginning to move from the conceptual introduction stage to a more detailed discussion of implementation. This aligns with policy developments in Indonesia, which during that period strengthened the electronic catalog ecosystem and accelerated digital transformation in procurement (Yuslina et al., 2026). Thus, the change in terminology is not merely a linguistic phenomenon, but a reflection of a shift in research orientation.

Another important discussion concerns implementation barriers. Although your bibliometric results show a positive trend in literature growth, the keyword map also raises issues such as problems, risks, and procedures. This suggests that the development of e-purchasing research is occurring alongside an awareness of implementation challenges. International literature supports this reading. Mohungoo et al. (2020) in their systematic review found that challenges to public e-procurement implementation are not only technological, but also organizational and environmental. The key challenges they identified include a lack of training and

skilled personnel, resistance to change, leadership issues, technological security issues, and limitations in the regulatory framework. The OECD also emphasized that limited digital skills and resistance to change remain significant barriers to the digital transformation of public procurement (Babica et al., 2019). Therefore, your research findings regarding limited human resources and work culture resistance are highly consistent with the broader literature.

From a methodological perspective, the fact that this study successfully mapped 537 articles, but only 525 were usable because 12 articles lacked a clear publication year, is also noteworthy. This demonstrates that using Google Scholar via Publish or Perish is very useful for reaching a broad literature, but researchers still need to conduct careful data curation. Therefore, the validity of bibliometric results depends heavily on thorough metadata cleaning, keyword integration, and document selection. In this context, the use of VOSviewer is relevant because it supports network-based bibliometric mapping and helps researchers systematically interpret patterns of relationships between terms (Liu et al., 2021). However, the interpretation of visualization results must still be linked to the substantive context of public procurement to avoid merely technical descriptions.

The results of this study confirm that e-purchasing has developed into a significant focus in public procurement studies. The increasing publication trend, the formation of four thematic clusters, and the shifting terminology over time indicate that this field is undergoing deepening and expanding research. At the same time, the literature map also indicates that implementation issues are not yet resolved; this is precisely where further research opportunities open up. Future research could focus on more specific analyses of the effectiveness of e-purchasing on government spending efficiency, increasing MSME participation, the quality of intersupplier competition, preventing corruption, and the capacity of government organizations to manage digital transformation. Thus, the main contribution of this research is not only to show that publications on e-purchasing are increasing, but also to show how knowledge about e-purchasing is being shaped, debated, and directed in the context of public procurement reform in Indonesia and more broadly in the government's digital transformation agenda.

## **CONCLUSION**

This study shows that studies on the application of e-purchasing in the procurement of goods and services in the Indonesian public sector have experienced significant development during the 2019-2024 period, as indicated by an increase in the number of scientific publications to 537 articles. These findings indicate that e-purchasing is increasingly becoming a significant focus in public procurement research, in line with the development of digital transformation in governance. However, the study also identifies several obstacles to e-purchasing implementation, particularly limited human resources and resistance to changes in work culture. These conditions indicate that the success of e-purchasing implementation depends not only on the availability of systems and technology, but also on the organizational readiness and capacity of actors involved in the procurement process. Furthermore, the bibliometric analysis reveals four main clusters that represent the focus of studies in e-purchasing research and shows changes in the terminology used in publications from year to year. This indicates that the topic of e-purchasing continues to develop dynamically, both in terms of themes and research approaches. The results of this study provide a comprehensive overview of publication trends, theme structures, and challenges of e-purchasing

implementation in the public sector. Therefore, these findings are expected to serve as a reference for academics, practitioners, and policy makers in formulating more effective strategies to strengthen the implementation of e-purchasing and encourage improvements in the governance of goods and services procurement in the public sector.

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### **CONFLICTS OF INTEREST**

The author declares no conflict of interest.

### **AUTHOR CONTRIBUTIONS**

The sole author contributed to all aspects of this study, including conceptualization, methodology, analysis, writing, and revision of the manuscript.

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### **DATA AVAILABILITY**

Data sharing is not applicable to this article because no new data were created or analyzed in this study.

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